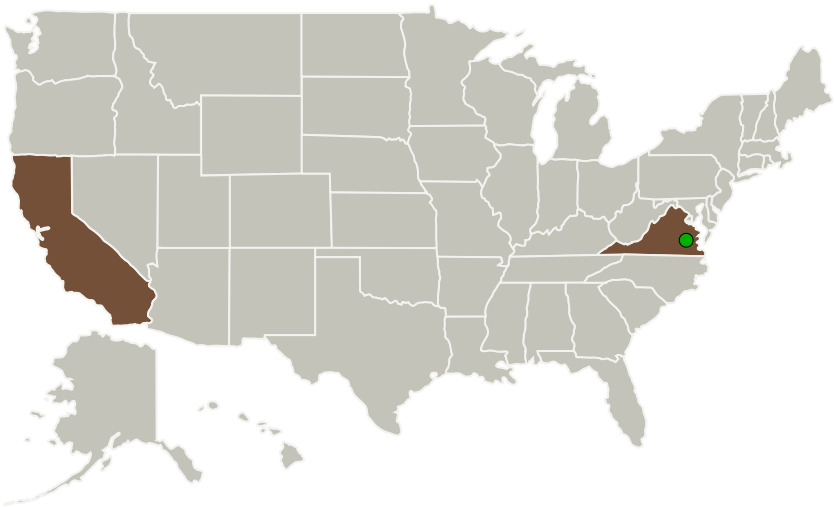
Oxygen-Independent Pressure Sensitive Paint, Phase I

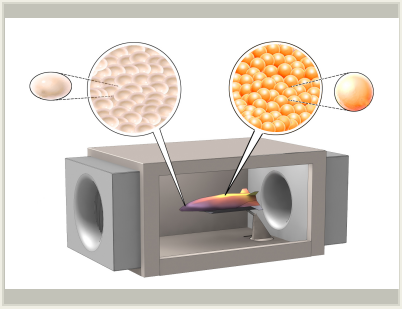
Completed Technology Project (2014 - 2014)

Project Introduction

Intelligent Optical Systems (IOS) proposes to develop a unique coating that uses fluorescence quenching in an entirely new way to provide high resolution images of the true pressure distribution on surfaces in hypersonic flow. IOS will use unique pigments whose fluorescence depends directly on absolute ambient pressure, not on the partial pressure of oxygen in the flow field, to develop coatings that will allow "legacy" (oxygen-based) visualization equipment to characterize flows in oxygen-free atmospheres. The new pigments will also be completely compatible with temperature indicating materials and binders currently used in temperature-compensated pressure sensitive paints. In Phase I IOS will create two different oxygen-insensitive pressure-sensitive pigment materials, combine them with a suitable binder, and apply the resulting paints to stainless steel test coupons. The fluorescence of these test samples will be measured under varying static pressures of pure nitrogen, and imaged in a low-speed flow environment at varying angles of attack. This will set the stage for Phase II development and delivery of a complete temperature-compensated true ambient pressure sensitive paint system that can be used to characterize flow around structures in hypersonic wind tunnels and other facilities where oxygen-independent pressure mapping is needed.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Intelligent Optical Systems, Inc.	Lead Organization	Industry	Torrance, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

June 2014: Project Start

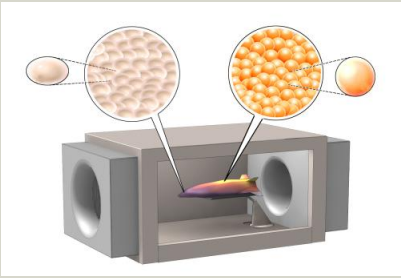
December 2014: Closed out

Closeout Summary: Oxygen-Independent Pressure Sensitive Paint, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/140515)*

Images



Briefing Chart Image
Oxygen-Independent Pressure Sensitive Paint, Phase I
(https://techport.nasa.gov/image/126149)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Intelligent Optical Systems, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

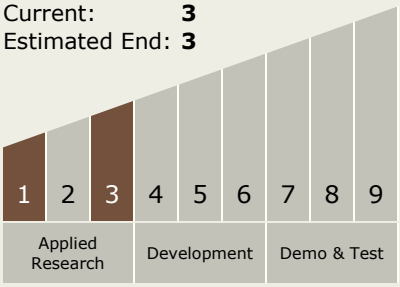
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jesus D Alonso

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.2 Test and Qualification
    - TX13.2.1 Mechanical/Structural Integrity Testing

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System